

# MATERIAL SAFETY DATA SHEET

**SRM Supplier:** National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2321  
Gaithersburg, Maryland 20899-2321

**SRM Number:** 1918  
**MSDS Number:** 1918  
**SRM Name:** Mercury Porosimeter  
Intrusion Standard  
**Date of Issue:** 08 July 2002

**MSDS Coordinator:** Carmen S. Davis  
**Phone:** (301) 975-6776  
**ChemTrec:** 1-800-424-9300

**FAX:** (301) 926-4751  
**E-mail:** SRMMSDS@nist.gov

---

## SECTION I. MATERIAL IDENTIFICATION

---

**Material Name:** Mercury Porosimeter Intrusion Standard

**Description:** A unit of SRM 1918 consists of one vial containing approximately 12 g of an extruded silica alumina compound.

**Other Designations:** **Silica** (quartz; alpha-quartz; silicon dioxide; silicic anhydride; agate; amethyst; chalcedony)/**Alumina** (aluminum oxide; dialuminum trioxide; aluminum sesquioxide; alpha alumina; beta alumina; gamma-alumina; alumite; almite; aluminum trioxide)

Name	Chemical Formula	CAS Registry Number
Silica	SiO <sub>2</sub>	14808-60-7
Alumina	Al <sub>2</sub> O <sub>3</sub>	1344-28-1

**DOT Classification:** Not hazardous by DOT regulations

**Manufacturer/Supplier:** Available from a number of suppliers

\* Trade name

---

## SECTION II. HAZARDOUS INGREDIENTS

---

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Silica	0.2	ACGIH TWA: 0.05 mg/m <sup>3</sup> (respirable fraction)
		OSHA TWA: 0.3 mg/m <sup>3</sup> (total particulate)
		OSHA TWA: 0.1 mg/m <sup>3</sup> (respirable particulate)
		Human, Inhalation: LC <sub>LO</sub> : 300 µg/m <sup>3</sup> /10 yrs (intermittent)
		Rat, Oral: LD <sub>LO</sub> : 90 mg/kg
		Rat, Inhalation: TC <sub>LO</sub> : 80 mg/m <sup>3</sup> /26 weeks
Alumina	99.8	ACGIH TWA: 10 mg/m <sup>3</sup>
		OSHA TWA: 5 mg/m <sup>3</sup> (respirable dust fraction)
		OSHA TWA: 15 mg/m <sup>3</sup> (total dust)
		Rat, Intrapleural: TD <sub>LO</sub> : 90 mg/kg (tumorigenic data)
		Rat, Implant: TD <sub>LO</sub> : 200 mg/kg (tumorigenic data)

---

**SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS**

---

Silica	Alumina
<b>Appearance and Odor:</b> solid, colorless to white crystal or amorphous powder; odorless	<b>Appearance and Odor:</b> solid, white to gray crystal or powder; odorless
<b>Relative Molecular Mass:</b> 60.09	<b>Relative Molecular Mass:</b> 101.96
<b>Density (water = 1):</b> 2.635 g/mL to 2.660 g/mL	<b>Density (water = 1):</b> 3.965
<b>Boiling Point:</b> 2230 °C	<b>Boiling Point:</b> 2980 °C
<b>Melting Point:</b> 1610 °C	<b>Melting Point:</b> 2053 °C to 2072 °C
<b>Vapor Pressure (@ 20 °C):</b> 0 mm Hg	<b>Vapor Pressure (@ 2158 °C):</b> 1 mm Hg
<b>Evaporation Rate:</b> not applicable	<b>Evaporation Rate:</b> not applicable
<b>Viscosity:</b> not applicable	<b>Viscosity:</b> not applicable
<b>Water Solubility:</b> insoluble	<b>Water Solubility:</b> insoluble
<b>Solvent Solubility:</b> soluble in hydrofluoric acid; insoluble in organic solvents	<b>Solvent Solubility:</b> slightly soluble in mineral acids and strong alkali

**NOTE:** The physical and chemical data provided are for the pure components. Physical and chemical data for this silica/alumina compound **DO NOT** exist. The actual behavior of the powder may differ from the individual components.

---

**SECTION IV. FIRE AND EXPLOSION HAZARD DATA**

---

**Silica and Alumina**

**Flash Point:** Not Applicable      **Method Used:** Not Applicable      **Autoignition Temperature:** Not Applicable

**Flammability Limits in Air (Volume %):** **UPPER:** Not Applicable  
**LOWER:** Not Applicable

**Unusual Fire and Explosion Hazards:** Silica and alumina are both negligible fire hazards. However, upon heating at high temperatures, silica combines chemically with many metal oxides. Explosions are possible with chlorine trifluoride, oxygen trifluoride, metals, and ozone in the presence of organic materials. Detonation is possible with silica and xenon hexafluoride.

Alumina may ignite with chlorine trifluoride. An explosive mixture may occur with alumina and sodium nitrate.

**Extinguishing Media:** Use extinguishing agents appropriate to the surrounding fire.

**Special Fire Procedures:** Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

---

**SECTION V. REACTIVITY DATA**

---

**Stability:**   X   **Stable**        **Unstable**

**Conditions to Avoid:** Avoid conditions which promote generating dust.

**Incompatibility (Materials to Avoid):** Silica is incompatible with bases, halogens, acids, metal salts, oxidizing materials, and combustible materials.

Alumina is incompatible with halo carbons, halogens, combustible materials, and oxidizing materials.

See Section IV: *Unusual Fire and Explosion Hazards*

**Hazardous Decomposition or Byproducts:** Thermal decomposition of silica and alumina produce miscellaneous products.

**Hazardous Polymerization:**        **Will Occur**   X   **Will Not Occur**

---

**SECTION VI. HEALTH HAZARD DATA**

---

**Route of Entry:**   X   **Inhalation**   X   **Skin**   X   **Ingestion**

**Silica:** Immediate exposure to high concentrations may cause physical discomfort of the upper respiratory tract. The extended inhalation of dusts containing free silica may result in the disabling pulmonary silicosis. The duration of exposure which is associated with the development of silicosis varies widely for different occupations. There is also much variation in individual susceptibility. The action of silica on the lungs results in the production of a diffuse, nodular fibrosis in which the parenchyma and the lymphatic system are involved. The fibrosis, to a certain extent, is progressive and may continue to increase for several years after exposure is terminated. Where the pulmonary reserve is sufficiently reduced, shortness of breath is often a symptom of exposure. This is the first and often most common symptom in cases of uncomplicated silicosis. If severe, it may incapacitate the worker for heavy or even light physical exertion. In extreme cases, there may be shortness of breath even while at rest.

Skin and/or eye contact with silica may cause irritation due to mechanical action. The effects of ingestion of large amounts are due to the mechanical action as silica materials are biologically inert.

**Alumina:** Inhalations of high concentrations of alumina may cause coughing, shortness of breath, respiratory tract irritation due to mechanical action, unpleasant deposits in the nasal passages, and exacerbation of symptoms in persons with impaired pulmonary function. Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns. Symptoms may develop with the onset of sudden thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing, and a dryness of the mucous membranes. Fever, chills, profuse sweating, excessive urination, diarrhea, and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside in a 24 hour to 36 hour period. Metal fume fever is typically not chronic, however, repeated episodes with symptoms are common.

Skin and/or eye contact with alumina may cause irritation due to mechanical action. Ingestion of large amounts of aluminum compounds may cause constipation.

**Medical Conditions Generally Aggravated by Exposure:** Respiratory disorders are aggravated by silica and alumina.

**Listed as a Carcinogen/Potential Carcinogen (Silica):**

	<b>Yes</b>	<b>No</b>
In the National Toxicology Program (NTP) Report on Carcinogens	<u>  X  </u>	<u>      </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u>  X  </u>	<u>      </u>

By the Occupational Safety and Health Administration (OSHA)

X

**Listed as a Carcinogen/Potential Carcinogen (Alumina):**

In the National Toxicology Program (NTP) Report on Carcinogens  
In the International Agency for Research on Cancer (IARC) Monographs  
By the Occupational Safety and Health Administration (OSHA)

Yes

No

X

X

X

**EMERGENCY AND FIRST AID PROCEDURES:**

**Skin Contact:** Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for irritations and treat them accordingly. Obtain medical assistance if necessary.

**Eye Contact:** Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

**Inhalation:** If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

**Ingestion:** If ingested, wash out mouth with water. Obtain medical assistance immediately.

**TARGET ORGAN(S) OF ATTACK:** **Silica:** upper respiratory tract (URT)  
**Alumina:** upper respiratory tract (URT)

---

**SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE**

---

**Steps to be Taken in Case Material Is Released or Spilled:** Notify safety personnel of major spills and/or leaks. Gather small spills and place into containers for disposal.

**Waste Disposal:** Follow all federal, state, and local laws governing disposal.

**Handling and Storage:** Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

**NOTE:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

This material should be stored in a cool, dry, well-ventilated area away from incompatible materials and conditions. Protect containers from physical damage.

---

**SECTION VIII. SOURCE DATA/OTHER COMMENTS**

---

**Sources:** MDL Information Systems, Inc., MSDS *Quartz*, 18 September 2001.  
MDL Information Systems, Inc., MSDS *Aluminum Oxide*, 22 March 2001.  
Merck Index, 11th Ed., 1989.  
The Sigma Aldrich Library of Chemical Safety Data, Ed. II, 1988.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.